



# Phila. Hub News Supplement– Energy Conservation



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## Energy Saving Tips



### Energy Action Plan

In FY 02, HUD adopted a 21-point, Department-wide Energy Action Plan in support of the President Bush's National Energy Policy.



The Plan is aimed at upgrading the energy efficiency of existing housing using an established inventory of proven energy-efficient products and appliances. This will be accomplished through consumer education and outreach, interagency cooperation, market-based incentives, and public-private partnerships.

The success of this effort will have a great impact on HUD which spends \$4 billion each year on utility allowances, housing assistance payments, and operating grants. Reducing HUD's energy bills by just 5% could yield a savings of \$2 billion over the next 10 years.

To promote this effort, many HUD offices will be scheduling Energy Conferences throughout the year. In addition, our office has compiled, in this special supplement, all of the articles that have been published on this topic in the past 38 issues of Philadelphia Multifamily Hub News.

### Reducing Energy Bills

Saving money on your energy bills depends on four major factors: 1. Energy efficiency of your systems, 2. Managing system operations, 3. Simple systems maintenance, and 4. Age and condition of your building.

One of the easiest ways to save money on your energy bills is to purchase a high efficiency heating and cooling system. Keep in mind that even the least efficient systems currently allowed by the federal government will always cost less to operate than systems installed over 10 years ago. In purchasing one, it is important to look for the right balance between the initial cost and long-term savings.

No matter how efficient your system is, the way that you manage its operation can affect your heating and cooling costs. Things like "set back" thermostats, programmable thermostats, and zoning systems can be of significant value in achieving savings.

Another key to savings is to change furnace or fan coil filters frequently, and to clean outdoor coils. Also, particularly with older less energy efficient buildings, you should make sure that they are adequately insulated, have storm windows and doors (if appropriate), and have good seals around windows, doors, and electrical outlets.

An often overlooked area of savings is the laundry room. Having an energy-efficient common laundry room is a sound strategy. Studies have shown that in-unit washing machines use 3.0 times more water than common area machines. In-unit machines tend to drain more water and electricity resources because tenants are more likely to do smaller, more frequent wash loads—resulting in soaring utility bills.

When you purchase appliances or building materials, look for ones that have earned the ENERGY STAR label. Some examples of the potential savings are: ceiling fans—10%, vent fans—65%, central air conditioners—20%, room air conditioners—10%, windows—10%, front-load washers, etc. To learn more about ENERGY STAR, visit its website at: [www.energystar.gov](http://www.energystar.gov).

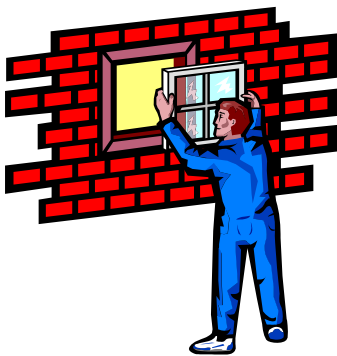
### **New EPA Policy on Sub-metered Apt. Buildings**

Under new guidance issued by the Environmental Protection Agency, (see December 23, 2004 Federal Register) projects that sub-meter and bill tenants for water usage, will not have to comply with the Safe Drinking Water Act (SDWA) that applies to public water systems.

In response to Congressional requests, the EPA reversed its position and stated that an apartment owner who individually meters units or bills separately for water is not selling water and, as a result, is not a fully regulated water system.

The National Multi Housing Council and the national Apartment Association had spoken out against the original ruling because it discouraged sub-metering and water conservation.

### **Tips for Leaking Windows**



Sealant failures are the prime cause of leaking windows. Such failures may be influenced by normal weathering, improper design (i.e., interface with facade components), or poor installation.

If you are faced with such a problem, consider the following tips, as set forth in the October 2004 issue of

Buildings before you embark on an expensive repair or replacement program:

- \*Maintain accurate leakage records, including the date, quantity, and location, as well as the weather conditions prior to the observed leakage.
- \*Do not authorize window system repairs without knowledge about the probable cause of the leakage.
- \*Engage a facade consultant experienced in the diagnosis of window systems to investigate leakage problems and outline repair options.
- \*Do not allow indiscriminate application of sealant as a shotgun approach to address leakage.
- \*Insure that any sealant repair/replacement program contains essential elements of proper sealant joint design and installation.

### **Self-Cleaning Windows**

Several major international glass manufacturers are now producing "self-cleaning" window glass. The exterior panes have a special self-cleaning coating that is actually invisible and is durable as the window glass surface itself.



The coating self-cleans the window by two continuous processes. Safe chemicals in the glass surface create a photocatalytic process when sunlight (especially ultraviolet rays) strikes the glass. This process breaks down and disintegrates organic dirt, which is the majority of dirt on windows.

The special surface also has a hydrophilic property that causes water to sheet and flow down the glass instead of forming beads when it rains. The glass can be cleaned by simple rain water or by a garden hose. Because of the sheeting action, you can see outdoors during a heavy rain almost as well when the weather outside is dry.

Another benefit is that the treated glass is energy efficient because, during the winter, the clean glass allows more solar heat to enter the interior living space.

### **Window Film**

An often overlooked way to save energy is to install window film. This simple measure can reduce the amount of solar heat in a building by as much as 65% (from 175 BTU/h-ft<sup>2</sup> to 65 BTU/h-ft<sup>2</sup>). This can account for one-third of a building's cooling load, depending on its location. Single-pane, tinted glass is the most common measure for existing buildings. Most window film carries a 10 year manufacturer's warranty, and the installed cost of \$3 to \$4 per sq. ft., commonly represents a 40% return on the initial investment!



### Exterior House Coatings

According to Textured Coatings of America, there is a new exterior coating that can make exterior walls of residential buildings virtually impregnable to water and high winds.

These coatings, which contain heavy concentrations of high-strength resins, have been used on airport control towers, bridges, and schools for years.



Unlike paint, the dense epoxy coatings add rigidity to exterior surfaces. Of particular benefit from the coating is stucco walls which tend to absorb water and allow moisture to penetrate the surface, often creating a mildew problem. The effect of the product is like coating a building in breathable plastic. In addition, the product reflects the sun's rays and results in lower cooling expenses.

Although the coatings look like paint (and come in dozens of colors), they require specialized sprayers and professional coating techniques.

More details can be obtained from the Textured Coatings of America's website at: [www.texcote.com](http://www.texcote.com).

### Energy Saving Ideas

As part of its "Smart Energy Campaign," the U.S. Department of Energy has introduced a web site, [www.energysavers.gov](http://www.energysavers.gov) that includes a virtual tour of a house to determine ways to save energy and information for children to get them to participate in conservation efforts.



Another good source for conservation tips is the non-profit Alliance to Save Energy. It offers both a website- [www.ase.org](http://www.ase.org)- and a free booklet, "Power\$mart: Easy Tips to Save Money and the Planet." The booklet can be obtained by calling 1-800-878-3256.

### Water-Saving Devices

This fiscal year, HUD will be stressing energy conservation in its existing and new projects. In this regard, project owners and managers should also be trying to conserve water where possible.

The following is a round-up of the latest water-saving devices, their cost, and their expected savings:

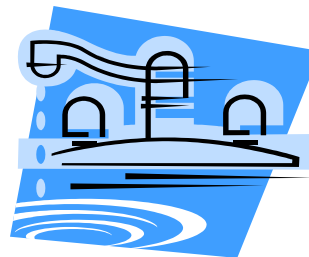


*\*Dual-Flush Toilet–* Uses .8 gallons for a liquid flush and 1.6 gallons for a solid flush. By, comparison, a low-flush toilet uses 1.6 gallons per flush and pre-1992 toilets use between 3.5-7 gallons. A household of four can save 11,000 gallons per year using a 1.6 gallon toilet vs. a 3.5 gallon toilet. The cost of a dual-flush model ranges between \$700-\$878.

*\*Pressure-Assisted Toilet–* Uses 1 gallon per flush. A family of four can save thousands of gallons per year. The cost is about \$425.

*\*Front-Loading Washer–* Uses tumbling action to clean clothes instead of immersing garments in water. This type of washer uses 14-25 gallons per load vs. 50 gallons per load for a top-loading washer. Manufacturers of front-loading washers claim a 68% savings and state that a family of four can save as much as 12,000 gallons per year. Because this type of washer uses less water it also uses less detergent. In addition, because they spin better, less energy is consumed drying clothes and there is less wear and tear on clothes. The cost of this type of washer range from \$650-\$1,299.

*\*Faucet Aerator–* Typical faucets emit up to 3 gallons per minute. Aerators restrict flow to as little as 1/2 gallon per minute. They work well on bathroom sinks but are impractical for tubs or kitchen sinks where a lot of water is needed. A typical family can save as much as 9,700 gallons per year. The cost is minimal at \$1.50 per device.

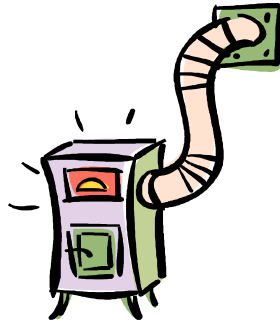


### **Furnace Efficiency**

If you will be replacing furnaces, keep in mind that whatever you choose should have a high annual fuel utilization rating (AFUE). The higher the AFUE, the more efficient the unit.

Federal Appliance Energy Standards of 1993 essentially require manufacturers to make units with an AFUE of at least 80%, and there are units that are up to 96% efficient.

Another energy saver is to use an electronically commuted, or ECM, blower motor. In a typical home, the annual cost to operate a standard furnace fan is \$250. However, an ECM would cost only \$50 per year.



### **Dryers and Furnaces**

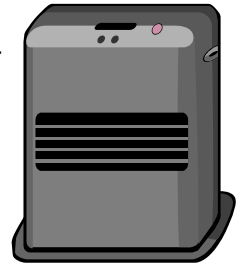
The American Gas Association (A.G.A.) has stated that gas dryers are a customer's best buy because of the energy value of natural gas and the latest high efficiency technology, such as pilotless ignition, automatic shut-offs, sensor controls, de-wrinkling cycles, and automatic cool-down cycles. In fact, it was reported that you can dry three loads of laundry for the money that it takes to dry one load in an electric dryer. Gas dryers also require little upkeep. The only things to keep in mind are to clean the lint screen regularly and to make sure that the exhaust is properly vented to the outside. Consumers should look for the Blue Star Design Certificate seal or another form certification from a nationally recognized testing agency.

Hearing systems should be serviced periodically by qualified contractors to insure that they operate in peak condition. Prior to the start of the heating system, a "check-up" should be performed. It should consist of the following steps:

- \*Inspection of the furnace vent system.
- \*Removal of any leaves, nests, or other obstructions from inside the chimney.
- \*Monthly replacement or cleaning of the air filter.
- \*Lubrication of the blower motor.
- \*Replacement of blower belts, if needed.
- \*Cleaning of pilots and burner chamber.
- \*Removal of dust and lint from furnace vents, registers, and baseboard heaters.
- \*Cleaning and adjusting of thermostats.

### **Electric Motors and Speed Drives**

One way to reduce energy costs in high-rise buildings is to install high efficiency electric motors for chillers (e.g., an upgrade of an 800 ton chiller, from 0.7kW/ton to 0.5kW/ton will reduce demand by 160kW, a 27% savings), and fan and pump motors (e.g., replacement of smaller motors can improve efficiency up to 15%). A plan can be developed to replace old motors with high efficiency units on a set schedule, or when they break down or need repairs. The initial premium cost can be recovered in energy savings during the first year- a 100% return on your investment. The energy savings will continue, so that by the end of the 5th year, the total cost of the motor will be recovered- a return of more than 20% per year.

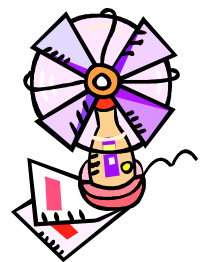


A second way to save on energy costs, is to use adjustable speed drivers (ASD) to allow HVAC motors of 100 hp or more, to reduce their speed (rpms) by 20%, when the system is at or below 70% capacity. This, typically, results in a 50% reduction of energy consumption.

### **Energy Efficient Air Conditioners**

Central and room air conditioners have become much more efficient in recent years. This translates into lower electricity costs during the summer months.

The current federal minimum SEER (Seasonal Energy Efficiency Ratio) for an air conditioner manufactured since 1992 is 10 SEER. This minimum is being increased to at least 12 SEER by the end of 2006.



Studies have shown that in a typical detached single-family property, a savings of \$155/yr. in electricity costs could be realized by replacing a 10-year old central air conditioning system with a 14 SEER unit. In addition to the utility savings, a homeowner would qualify for a \$500 rebate from his utility company for the upgrade. Combined, this would be a savings of \$1,275 over the next five years. In addition, many manufacturers are also offering their own rebates on new models. This savings would be magnified if the unit that was being replaced had a SEER of only 6. In this case, the savings would be \$434/yr. In 5 years, the system would almost pay for itself with a total savings of \$2,670.

In comparing the energy efficiency of room air conditioners, look for the bright yellow Department of Energy



Guide and Energy Star labels. Each Energy Guide label gives you an estimated yearly operating cost of that unit at various utility rates and hours of use. Similarly, the ENERGY STAR™ symbol identifies products that save energy and money and protect the environment.

### **Green Roofs**

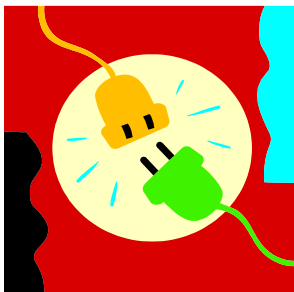
A new trend is starting in the United States— green roofs. Green roofs have been fairly common in Europe, especially Germany, for years. The idea is to cover roofs with 3-6" of soil and create a "meadow" of native plants and grasses. The soil and plants act like a sponge to absorb rainwater, create insulation, and protect the roof.



In urban Europe, where asphalt covers much of the land, green roofs help to reduce the amount of water runoff that enters storm drains and, eventually, rivers. Most green roofs in the U.S. are on newer commercial or public buildings. However, many older buildings, especially ones constructed with brick in the 1920s, can be retrofitted. The key is that the roof must be able to support 13 lbs. per sq. foot.

### **Energy Usage**

Do you know how to accurately determine your project's energy usage? The National Apartment Association recommends that that you follow these simple 8 steps: 1. Obtain a printout of fuel usage (i.e., consumption-not bills); 2. Select approximately one year of usage; 3. Determine which fuel is the most expensive by BTU; 4. Separate heating from hot water consumption; 5. Calculate base energy usage (e.g., for oil and gas— June through September); 6. Break it down on a daily basis in order to help estimate how efficiently the buildings are heated, cooled, and make hot water; 7. Divide the consumption by the square footage of the building to determine BTUs/Square Foot Per Year; and 8. Factor in Degree Days (available from newspapers).



Two free HUD publications that you may find particularly useful are: "Energy Conservation for Housing— A Workbook" (call 1-800-955-2232), and "HUD Multifamily Walk-through Energy Survey". This document can be obtained from the local HUD office.

### **Fluorescent Bulbs**

Fluorescent bulbs have long been a popular choice among apartment managers as a way to save on electricity costs. They produce four times the lumens for an equivalent amount of watts. However, one of the disadvantages of fluorescent bulbs has always been the harsh light that they emit. Now, several manufacturers, such as Philips and GE, have come out with a new line of "soft-tone" bulbs. Although the bulbs eliminate the stark white light of standard fluorescent, they are much more expensive (e.g., instead of \$2 for a 48" fluorescent tube, prices range from \$4-\$25). Manufacturers state that although the new bulbs are more expensive than incandescent bulbs, they still have the energy savings of standard fluorescents (e.g., a 28 watt soft-white fluorescent can save \$100 in energy costs over its life (10,000 hours) compared to incandescent bulbs.



### **High Efficiency Lighting**

Projects can save an additional 3-6% in energy costs using high efficiency electronic ballasts. When they are used with newer T8 lamps, you could save up to 11%. In order to achieve this savings, you should install ballasts with light output factors of .78 (for converting a 34 watt T12 lamp to a T8), and .88 (for new construction). You can save even more by using occupancy sensors to reduce or turn off the lights when rooms are not in use.

### **Energy Codes**

The Energy Desk Book for HUD Programs contains a section on HUD's energy codes requirements. Among other things, the Desk Book contains the DOE Building Codes Assistance Project (BCAP) summary of the status of state adoption of energy codes. It is updated a few times a year. Below is the URL to the Winter 2002 version:

[www.huduser.org/Publications/PDF/energybook.pdf](http://www.huduser.org/Publications/PDF/energybook.pdf).



## **Water Conservation**

Water rates have risen dramatically over the past several years to over \$500 per year for the average American home and are expected to double in the next two years. This large increase is due primarily to improvement of water treatment facilities, the lack of federal subsidies for infrastructure work, and the need for improved capacity and safer drinking water. In addition, in recent years, many communities imposed water use restrictions because of summer drought conditions.



In response, many apartment owners implemented water conservation measures themselves, or through performance contractors whose fees were paid from the savings on utility expenses. Some of the measures that can be taken are as follows:

- \*Reduced flow showerheads.
- \*Reduced flow aerators (1.5 gpm).
- \*Removal of sediment from system.
- \*Repair of all interior and underground leaks.
- \*Anti-scald valves.
- \*Leak prevention siphons on toilets.
- \*New toilet flappers every 5 years.
- \*Computerized hot water loop controls.
- \*Landscape irrigation controls.
- \*Leak-proof faucets (with ceramic valves).
- \*New pool filter media (minimize back-flushing).
- \*Use of electroplating and filtering minerals to lower water chemical consumption in cooling towers.
- \*Sub-metering.

Your water consumption goal should be 50 gallons per person per day. If you successfully implement the above conservation measures, you will be pleasantly surprised at the savings that will be generated.

HUD and the Partnership for Advancing Technology in Housing (PATH) have published a guide, Overview of Retrofit Strategies: A Guide for Apartment Owners and Managers to help owners and managers of multi-family properties address these challenges through water conservation. This publication describes techniques property managers may use to conserve water, with approaches requiring modest investment and minimal construction. By describing options in a non-technical manner, owners and managers will be able to select the most appropriate conservation measures for their particular situation. Although the primary benefit of conserving water will be a reduction in the costs of

operating the building, secondary benefits may include higher property values, some energy savings, and improved relations with residents.

Both this guide, and a companion guidebook, Retrofitting Apartment Buildings To Conserve Water: A Guide for Managers, Engineers, and Contractors, are available free from HUD USER. To download a copy, visit the following website: [www.huduser.org/publications/destech/retrofitting.html](http://www.huduser.org/publications/destech/retrofitting.html).

## **Laundry Equipment**

For maximum efficiency and cost savings laundries should be equipped with Energy Star-qualified washers and dryers.



In addition, you should look at the water extraction (i.e., drying) speed of washing machines. Top loading models should operate at 710 rpm and front-loaders at 1,000 rpm. (See the October 2004 issue of Philadelphia Multifamily Hub News). Also, to maintain a consistent water temperature the washer should be preset to the permanent-press/warm setting.

Gas dryers are preferable to electric models because they cost 1/3 less to operate. Gas heat also will dry clothes faster. Make sure, however, that there is enough "make-up air"- the air that the gas burners require to burn efficiently.

If you have to use electric dryers, make sure that they are using the correct electrical service. If they are not sized properly (i.e., matched with the correct voltage) the dryers will take longer to dry clothes and will cost more to operate.

Other tips to consider are: use metal vents to avoid lint blockages; make sure that lint traps are emptied after each wash-load; and encourage the use of washers and dryers during off-peak times.

Note: The Multi-Housing Laundry Association has asked the EPA to consider a water-efficient product-labeling program similar to Energy Star, the government program that identifies energy-efficient products. It is believed that such labels will help encourage apartments to purchase water-efficient appliances and adopt common laundry facilities to conserve water.

## **Combined Heat & Power Guides**

HUD's Energy website now contains two new guides concerning cogeneration- combined heat and power (CHP) in multi-family housing.

The guides were produced as part of the implementation by HUD and DOE of the HUD Energy Action Plan. Initiative Number 20 in that Plan commits HUD to promote the use of combined heat and power in housing and community development.



CHP can significantly reduce a building's annual energy costs. Instead of buying all of the building's electricity from a utility and separately purchasing fuel for its heating (mechanical) equipment, most- or even all- of the electricity and heat can be produced for less money by a small on-site power plant operating at a higher combined efficiency.

The type of CHP system commonly applied to multifamily housing uses a device that contains an engine, similar to that found in a car, or a micro-turbine, that drives a generator to produce electricity. The heat (thermal energy) produced by this process is recovered and used to produce hot water or steam, operate a chiller, or serve as a dessicant instead of being exhausted from the engine and transferred through the engine radiator (as in a car).

Guide #1: "Q&A on Combined Heat and Power," addresses the questions typically asked by those exposed to CHP for the first time.

Guide #2: "Feasibility Screening for combined Heat and Power, " explains use of the computer software developed by the Oak Ridge National Laboratory. If you insert utility cost and rate information for the past twelve months, the Guide will roughly calculate the return on investment from installing combined heat and power. That computer software will soon be put up on the Oak Ridge National Laboratory web site and linked to HUD public and assisted housing, FHA multifamily mortgage insurance and CPD web sites.

The guides can be downloaded at: [www.hud.gov/offices/cpd/energyenviron/energy/index.cfm](http://www.hud.gov/offices/cpd/energyenviron/energy/index.cfm) under "What's New."

## **Dual-Flush Toilets**

An economical way to save on water bills is to install dual-flush toilets. These toilets, which have been in use in Europe, Australia, and Japan for at least 30 years, offer 0.8 gallon and 1.6 gallon flushing options.

Their design is better than most of the 1.6 gallon, one-flush toilets that have generated so many complaints over the years. They are also reasonably priced, with most models costing less than \$300 each.



## **New Lighting Cuts Expenses**

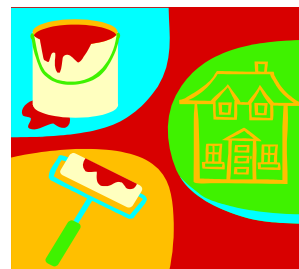


The lighting industry has created brighter, cheaper compact florescent lamps, or CFLs, that help reduce high energy costs.

CFL usage has increased from 2.3% of the bulb market in 1999 to 5.6% in 2006. This increase is attributable to two factors- the high cost of electricity (lighting accounts for 20% of a home's electricity costs) and the lower cost of the CFL bulbs that have decreased from, \$10-\$15 to \$5 (note the cost per bulb is actually cheaper if purchased in bulk quantities).

## **Insulation Paint**

The insulation factor of dwellings can be enhanced by the application of exterior insulation paint or insulating paint additives. These products use a blend of insulating ceramic microspheres or "vacuum beads", that are designed specifically for mixing into paints, coatings and composites to form a tight interlocking matrix which reduces conductive heat through the painted surface. The ceramic barrier reflects up to 90% of the heat back to the source. They are designed to keep heat out in summer and reflect the heat back in during the winter drastically reducing the costs required for heating or cooling.



For more information, see the websites of the following manufacturers: Chem-Rex ([www.chemrex.com](http://www.chemrex.com)), Insuladd ([www.insuladd.com](http://www.insuladd.com)), and Hy-Tech Insulating Paint, ([www.hytechsales.com](http://www.hytechsales.com)).

### **Tip for Efficient Laundries**

To save on energy costs for central laundries, you should consider installing card-operated appliances so that your operator can set a higher vender price for hot-water washes and a lower price for cold-water washes.

### **Forensic Engineering**

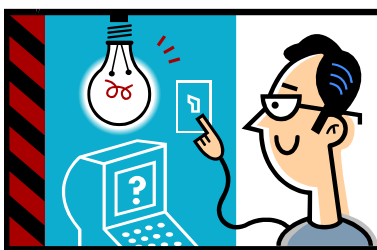
A new and “high-tech” way to diagnose and prevent problems, or analyze system performance in high-rise buildings, is to employ the techniques of forensic engineering.

Forensic engineers, when possible, use non-invasive devices such as electromagnetic detection equipment, infrared imaging, ground-penetrating radar, and X-ray imaging to analyze complex structural or system problems. When necessary, they also utilize bore-scopes, fluorescopes, and videoscopes to minimize the amount of material that must be removed for the inspection.

Forensic engineering can be used to detect construction deficiencies (e.g., improper exterior wall flashing), maintenance deficiencies (e.g., roof penetrations), design flaws (mold due to improper mechanical ventilation system), causes of pipe corrosion, etc. It can also be used to recommend elements to incorporate into the



### **New Lighting Technology**



There is a new lighting product on the market that provides the same amount of light as standard incandescent bulbs but provides substantial utility savings to the user.

The new product is a spiral-shaped bulb that uses phosphors in argon-filled tubes. A unique feature of these bulbs is the phosphors- powdery elements that glow within their argon-filled bulbs to create warmer hues similar to incandescent bulbs. These bulbs are Energy Star-qualified and use lower wattage than conventional bulbs while providing the same brightness (e.g., 800 lumens for an equivalent 60-watt incandescent bulb). It is estimated that by replacing five lights with this product, a savings of \$60 per year could be achieved.

### **PHFA’s “Green” Building**

Last year, the Pennsylvania Housing Finance Agency (PHFA) moved into its new headquarters’ building in downtown Harrisburg, PA.



In designing its new building, PHFA incorporated some of the historic characteristics of the surrounding properties and the latest technologies for energy conservation and environmental sensitivity. Another goal was to design working conditions that enhance and encourage productivity.

For starters, the office building was designed with a light beige color with a white roof to reduce the “heat island effect” that is common to dense urban areas. Because the building reflects heat, it has a reduced air-conditioning load and energy consumption. The building also features an abundance of glass and windows reducing the need for artificial light.

Integrated systems are centrally managed and monitored to work together. For example, the lights are controlled by photocells that adjust overhead lighting as needed. Rooms have motion sensors to turn lights off and on when someone enters a room. Interior paints were also selected for their reflectivity.

Other unique features of the building are: a 10,000 gallon rainwater storage tank for toilet flushing, low-volume plumbing fixtures, high level of roof and wall insulation, steam heat from Harrisburg’s municipal incinerator, a fresh air intake system using carbon monoxide sensors, compartmentalized ventilation, 25% recycled materials (carpets, wall fabrics, steel, and concrete), use of renewable resources (e.g., bamboo floors), and modular workstations with ergonomic chairs.

Lastly, 80% of the waste generated during construction was recycled.

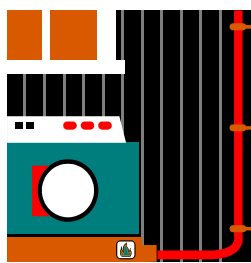
The building is an excellent example of an efficient, environmentally sensitive 21st century building. After the mandatory operating cycles and testing periods required for accreditation, it is expected to earn a “Silver Certification” from the U.S. Green Building Council– the second highest level in the LEED (Leadership in Energy and Environmental Design) rating system.



### **Saving Money on Utilities**

K & M Management of Dallas, TX has implemented a novel idea to save on its projects' sewer bills. It has convinced all of the towns in which it manages properties to deduct the volume of water used for landscaping from its sewer bills. It accomplished this by sub-metering its buildings to measure how much water is used to irrigate its lawn areas. Although the meters and the sprinkler piping can cost between \$3,000-\$30,000, the system can quickly pay for itself. (Reference: June 2005 issue of Apartment Finance).

### **Motor System Efficiency**



The U.S. Dept. of Energy has created a free software tool, called MotorMaster+, to help owners to manage existing motor systems and select energy efficient replacements. The tool handles everything from calculating pay-back on a single motor purchase to comprehensive, integrated motor system management. The website is as follows: [www.oit.doe.gov/bestpractices/software\\_tools.shtml](http://www.oit.doe.gov/bestpractices/software_tools.shtml).

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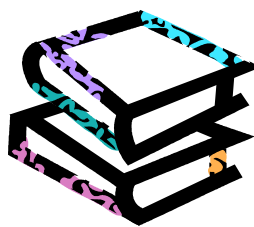
### **Energy Star Appliances**



The payback time for purchasing Energy Star appliances is surprisingly quick.

You can recoup the expense of a washer in 4 years; a dryer in 3 years, and a dishwasher in only 1 1/2 years!

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The guides were produced as part of the implementation by HUD and DOE of the HUD Energy Action Plan. Initiative Number 20 in that Plan commits HUD to promote the use of combined heat and power in housing and community development.

CHP can significantly reduce a building's annual energy costs. Instead of buying all of the building's electricity from a utility and separately purchasing fuel for its heating (mechanical) equipment, most- or even all- of the electricity and heat can be produced for less money by a small on-site power plant operating at a higher combined efficiency.

The type of CHP system commonly applied to multifamily housing uses a device that contains an engine, similar to that found in a car, or a micro-turbine, that drives a generator to produce electricity. The heat (thermal energy) produced by this process is recovered and used to produce hot water or steam, operate a chiller, or serve as a dessicant instead of being exhausted from the engine and transferred through the engine radiator (as in a car).

Guide #1: "Q&A on Combined Heat and Power," addresses the questions typically asked by those exposed to CHP for the first time.

Guide #2: "Feasibility Screening for Combined Heat and Power, " explains use of the computer software developed by the Oak Ridge National Laboratory. If you insert utility cost and rate information for the past twelve months, the Guide will roughly calculate the return on investment from installing combined heat and power. That computer software will soon be put up on the Oak Ridge National Laboratory web site and linked to HUD public and assisted housing, FHA multifamily mortgage insurance and CPD web sites.

The guides can be downloaded at: [www.hud.gov/offices/cpd/energyenviron/energy/index.cfm](http://www.hud.gov/offices/cpd/energyenviron/energy/index.cfm) under "What's New."

## **Energy Conservation**

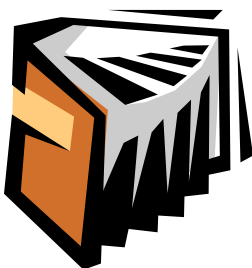


Public Housing utility costs total around \$1.3 billion per year. To cut this cost, HUD promotes energy and water conservation through the Public Housing Energy Conservation Clearinghouse (PHECC). The PHECC website includes information on Energy Performance Contracting, education materials for residents, funding

incentives, maintenance strategies, a training calendar, and more.

PHECC also distributes a monthly newsletter. It features up-to-date energy news and resources to help public housing authorities efficiently manage energy and water costs. To see past issues of this e-newsletter, and to access more information and tools for public housing authorities, visit the Public Housing Energy Conservation Clearinghouse Website at: [www.hud.gov/offices/pih/programs/ph/phecc/index.cfm](http://www.hud.gov/offices/pih/programs/ph/phecc/index.cfm).

## **Energy Desk Book**



Energy efficiency is essential to help the Department achieve its goals, including expanding affordable housing, increasing homeownership, and creating jobs and economic opportunity. In 2000, HUD published an Energy Desk Book which spotlighted the heavy burden utility costs can place on

affordable housing and economic development. The book remains relevant today as it reviews the important energy mandates for HUD programs and discusses the resources available to reduce these costs for American families and communities. By improving energy efficiency, HUD can help families save money they otherwise would need to spend on energy- freeing up precious dollars for food, shelter, and other necessities. Lower utility costs also can help communities by helping business and industry and contributing to economic growth.

The Energy Desk Book is a tool that you may find useful to identify opportunities to incorporate energy conservation measures into your buildings. The book can be downloaded at:

[www.huduser.org/publications/destech/destech3.html](http://www.huduser.org/publications/destech/destech3.html).

## **Utility Expenses**



Utility expenses this winter have increased dramatically. To help mitigate the impact on your property, you should take the following actions:

1. *Energy Plan.* Conduct an energy conservation plan for your property. Make sure that your property is weather insulated to avoid “energy loss.”
2. *Educate Tenants to Conserve.* Circulate flyers reminding tenants/residents to conserve energy.

3. *Utility Allowance.* Make sure that the amount of allowance is still accurate. Determine if an increase in the dollar amount is necessary. Please refer to Chapter 7 of HUD Handbook 4350.01 Rev-1 for information regarding utility allowance increases.

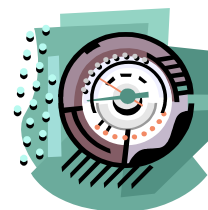
4. *Utility Company Coordination.* You may contact your utility company for programs relating to energy conservation, payment plans and/or grants. If possible, make larger monthly (higher amount than your regular bill) payments to cover anticipated higher bills for winter months.

5. *Budget Review.* Identify the source of money in your budget that you can use to cover the anticipated higher energy bill.

6. *Budget Rent Increase/Reserve & Residual Accounts.* For properties that may require special budget increases or disbursement of funds from the Reserve or Surplus Accounts, please contact your assigned HUD Project Manager to discuss these options.

## **Pilot Energy Program**

Public Service Electric and Gas has expanded a pilot program to give consumers greater control over their energy use. The “myPower” pilot program has been offered to 800 residents in Cherry Hill and Franklin Township, NJ. Business and home customers will have special thermostats installed that will allow them to receive information about changing energy prices. The customers will then have the option of moving their energy usage to times when prices are lower, such as evenings and weekends.



## Thrifty Appliances



With rising utility bills, it is becoming vital that project owners and managers replace inefficient appliances with Energy-Star label units.

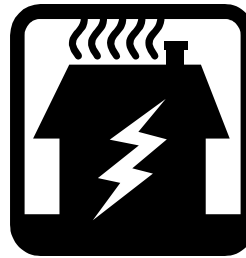
*Refrigerators-* A kitchen's biggest energy drain is its refrigerator. Energy-Star models use 40% less energy than conventional machines sold as recently

as 2001. Look for ones with compressors that run at more than one speed so they do not use high energy levels unless necessary.

*Washers-* Energy-Star front and top-loading washers use 50% less energy than standard models, saving up to \$110 per year. [Review the Modified Energy Factor (MEF) at [www.energystar.gov](http://www.energystar.gov)]. The higher the number, the less energy per load. New top-performing "duet" washers save energy and water (more than 12,000 gallons a year).

*Dishwashers-* Energy-Star models use 25% less energy than standard machines. By replacing a pre-1994 model, you can save more than \$25 a year. New two-compartment units save even more because you can run small loads in one compartment instead of running the whole machine.

## Radiant Flooring



Nursing homes and assisted living units are beginning to incorporate radiant floor heating into their buildings where elderly tenants are particularly prone to cold temperatures.

Radiant floor heating warms a space from the ground up. Besides making living areas more comfortable for the elderly, it also saves energy.

There are two types of radiant heat methods. One option pumps water heated by natural gas through a matrix of pipes. A drawback of this method, however, is the installation expense. The second is a network of low voltage electric wires laid beneath tile or laminate surfaces and encased in insulative mats fitted to the configuration of the floor. (Note: It cannot be installed under carpets or wood floors). The mat is rolled out and held in place by adhesive. Flooring is then on top of the mats.

This system uses "zoned" wiring in areas frequently used such as bathrooms, kitchens, and family rooms. Twelve watts per square foot generates floor temperatures from 82° to 90°. Since objects that come into contact with the floor are heated, the occupants feel warm even though the air temperature inside the is cooler.

The advantages of radiant floor heating are: lower operating costs, higher reliability (no moving parts), no cooling air drafts. Energy savings can also be enhanced by using programmable thermostats that allow occupants to turn off the system at night or when away from their units. The system can be set to turn on shortly before occupants arise in the morning or return to their units.

The best time to install these systems is during new construction or amid renovations when the existing floor is removed.

### **Cogeneration in New Jersey**



In the December 2005 issue of Philadelphia Multi-family Hub News, we discussed the availability of two new energy guides on cogeneration that are available from HUD's energy website at: [www.hud.gov/offices/cpd/energyenviron/energy/index.cfm](http://www.hud.gov/offices/cpd/energyenviron/energy/index.cfm).

Rowan University, in Glassboro, NJ, a previous recipient of a \$153,364 HUD college housing grant, has become a model for this concept and is helping the state meet a major challenge— the coexistence of economic development and environmental protection. Overall, it has invested about \$26.5 million to upgrade its power plant. By September 2006, it will be producing 1.5 megawatts of power. This will generate close to 80% of its electricity needs and will provide air conditioning to some of its buildings. Cogeneration which involves taking heat energy- a byproduct of electricity production- will use it to heat and cool campus buildings rather than expelling it into the atmosphere and contributing to air pollution.

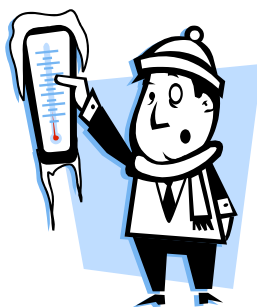
Here's how Rowan's cogeneration units work:

- \*Natural gas or fuel oil mixes with air in a combustion turbine to create energy.
- \*The energy is used to move the blades of a generator, which produces electricity for campus use.
- \*At the same time, the heat from the combustion process is used to heat water, which produces steam.
- \*The steam moves through underground lines to campus buildings, where it is used for heating and hot water.
- \*The steam can also proceed to a water chiller, where it is used to power machinery that cools water for air conditioning.

Projections show that Rowan will save around \$1.2 million a year. This is attractive because the school spent \$7.3 million on electricity, natural gas and fuel oil between July 2004 and June 2005 (reference January 9, 2006 Courier-Post).

Because of the project's high energy efficiency, the school will receive \$1 million rebate from the NJ Board of Public Utilities' Clean Energy Program and about \$600,000 in rebates for other energy initiatives around the campus.

### **New Air Conditioning Standards**



New air conditioning standards went into effect January 2006 for newly manufactured central air conditioning systems to increase energy efficiency in residences.

The new SEER standard is now 13. This high efficiency standard will greatly reduce energy costs and will save the nation \$1 billion over the next 25 years.

For more information go to: [www.eere.energy.gov/buildings/appliance\\_standards/residential/central\\_ac\\_hp.html](http://www.eere.energy.gov/buildings/appliance_standards/residential/central_ac_hp.html).

### **Practical Conservation Tips**



The following practical energy conservation tips have been suggested by PGW (Philadelphia Gas Works):

1. Insulate, especially under the roof. Caulk and weather-strip doors and windows.
2. Install storm windows. Use drapes and blinds to reduce loss of heat through glass.
3. Keep furnace filters clean and

your heater operating efficiently.

4. Install a programmable thermostat. It can save as much as 33% on energy bills and can usually pay for itself within a year. (Prices start at about \$30).
5. Set your programmable thermostat to 68° or lower during active hours. Lower the temperature at night and when everyone is away.
6. Use kitchen and bath ventilating fans sparingly in cold weather. In just one hour, these fans can blow away a house-full of warm air.
7. Make sure doors fit snugly and are weather-stripped. Repair any cracked glass or loose putty. Fix leaky faucets.
8. Insulate your gas water heater, drain sediment from the bottom of the tank, and set the temperature to 120°.
9. Replace aging appliances with new high-efficiency equipment, if possible. A 93%-efficient furnace saves an average of \$135 per year in fuel costs, compared to a conventional 78%-efficient model.
10. Reverse the blade rotation on ceiling fans to draw warm air down to living spaces. This can cut heating bills by as much as 10% a season.



**Best Practices**

This compilation of articles from past issues of Philadelphia Multifamily Hub News, are practical ideas that you, our project owners and managers can implement to conserve energy and minimize utility costs.



We are certain, however, that many of you have already implemented many of these suggestions, as well as other innovative ideas.

It would be a tremendous benefit if these ideas could be shared with all members of the multifamily housing industry. If you are willing to provide a narrative discussing the measures that your project has taken to reduce energy consumption, we will highlight your efforts in a future issue of Philadelphia Multifamily Hub News.

Please send your narratives by e-mail (Word attachment) or mail to:

Thomas\_Langston@hud.gov, or

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The Wanamaker Building  
Philadelphia, PA 19107  
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